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OCTOBER 15, 1997

**FOREWORD AND EXECUTIVE SUMMARY LETTER
FOR
PROGRAM SOLICITATION NO. DE-PS26-98FT98200**

**SUPPORT OF ADVANCED COAL RESEARCH AT U. S. UNIVERSITIES
AND COLLEGES**

FOREWORD:

The Department of Energy (DOE) Federal Energy Technology Center (FETC) is issuing this solicitation on the FETC World Wide Web Server in Portable Document Format (PDF). The URL for the FETC site is:

<http://www.fetc.doe.gov/business/solicit/solicit.html>

All files pertinent to this solicitation have also been created using Windows WordPerfect 5.1 and are available upon request. Requests should be forwarded to Debra A. Duncan at the address prescribed in Section 8.1, by facsimile to 412-892-6216, or by E-mail to: duncan@fetc.doe.gov.

YOU SHOULD PRINT ALL FILES PRIOR TO PREPARATION OF THE APPLICATION.

EXECUTIVE SUMMARY LETTER:

The purpose of the Executive Summary Letter is to summarize and alert prospective offerors to the salient elements of the attached Program Solicitation. This letter is not an integral part of the solicitation, which is a self-contained, stand alone document. In the event of any conflict between the contents of this Executive Summary Letter and the attached solicitation, the solicitation language will prevail.

Subject to requirements of the solicitation which restrict eligibility to U.S. universities and colleges, you are invited to submit an Application for Federal Financial Assistance to the U.S. DOE for the "Support of Advanced Coal Research at U.S. Universities and Colleges." The application may be submitted for

consideration under the "University Coal Research (UCR) Core Program" or the "UCR Innovative Concepts Program "

IT IS STRONGLY RECOMMENDED THAT THE PRINCIPAL INVESTIGATOR COORDINATE THE SUBMISSION OF THE APPLICATION, SPECIFICALLY THE DOCUMENTS REQUIRED IN VOLUME II-BUSINESS/FINANCIAL, WITH HIS/HER UNIVERSITY BUSINESS OFFICE AT THE ONSET OF APPLICATION PREPARATION. THE AUTHORIZED REPRESENTATIVE OF THE SUBMITTING INSTITUTION, NOT THE PRINCIPAL INVESTIGATOR, SERVES AS THE CONTACT POINT FOR NOTIFICATION OF ACCEPTANCE/REJECTION OF THE APPLICATION AND NEGOTIATION OF ANY APPLICATION SELECTED FOR AWARD.

The application is to be submitted in two (2) separate volumes: Volume I-Technical and Volume II-Business/Financial. Three "certifications" are required to be submitted: (1) Certification of Intent to Comply with DOE Budget Limitations and Cost-Sharing Requirements, (2) Teaching Professor/student Employment Certification, and (3) Certification of Intent to Comply with DOE NEPA (National Environmental Policy Act) Requirements. These certifications do not relieve the preparer of responsibility for putting forth a good faith effort in preparing the budget and environmental submissions that satisfy the solicitation requirements.

NOTE: NEPA REQUIREMENTS - DOE has issued NEPA Implementing Regulations which apply to research and development projects. Upon selection notification, successful award recipients and other team members, as appropriate, will be required to complete an Environmental Questionnaire within thirty (30) days.

Guidelines for preparation and submittal of your application are contained in the solicitation, however, **your attention is drawn to the following items which may result in rejection of an application without further consideration for award:**

- 1) **Failure to provide Volumes I and II**, with all requisite signatures, as defined in Section 7.3 of the solicitation.
- 2) **Failure to submit a timely application**, as defined in Section 8.2. IF IN DOUBT AS TO THE BEST MEANS OF ENSURING A "TIMELY" APPLICATION SUBMISSION, THE DOE **STRONGLY ENCOURAGES THE OFFEROR TO USE THE U. S. POSTAL SERVICE.** When an application is consigned to a private carrier for delivery, the offeror assumes the risk that the application will be received by the deadline date and time established in the solicitation. **Applications delivered by private carrier (i.e., any means other than the U.S. Postal Service) that arrive after 3:00 PM local Pittsburgh time, on November 26, 1997 will be rejected without review. Applications sent by the U.S. Postal Service must be postmarked on or before November 26, 1997.** If an application is sent by via the U.S. Postal Service, "Certified" or "Priority" Mail should be used to establish proof of the date of posting. Privately metered postage does not serve to establish that the application submission meets the definition of "timely."

- 3) **Failure to keep contracting costs at or below 25% of the proposed cost to DOE**, as defined in Section 4.1. Note that this is not the same as the requirement to cost share 25% of the total project cost under the Joint University/Industry Applications.
- 4) Applies only to Joint University/Industry and Joint University Applicants] Failure to identify team members, as required in Section 3.1. To be eligible for consideration, a team for Joint University/Industry Applicants must comprise the submitting institution, at least one other university/college and an industrial collaborator. A team on the Joint University Applications must constitute the submitting institution and at least two other colleges or universities.

The above list is not all inclusive; therefore, particular attention must be given to the specific requirements for application preparation and eligibility set forth in the solicitation.

This Program Solicitation does not commit the Government to pay costs incurred in the submission of an application or in making studies for its preparation. DOE's policy is to discourage "brochuremanship" and unnecessarily costly application preparation. Applications should be prepared with maximum economy, consistent with this Program Solicitation, to ensure that the resources of both offerors and evaluators are efficiently utilized. Section 7.3.1 limits the technical portion of the application (Volume I-Technical) and text in excess of the limit will not be provided to the reviewer for consideration.

You are advised that applications submitted under this solicitation are subject to technical review and evaluation utilizing personnel (peer reviewers) from universities, industry and national laboratories, in addition to DOE personnel. Furthermore, certain application material submitted may become subject to disclosure to the public pursuant to the provisions of the Freedom of Information Act, as amended. See Section 7.4, Proprietary Information, for guidance on proper marking of application information.

Multiple federal assistance (grant) awards will result from this solicitation. DOE may award a grant based on initial applications received, without discussion of such applications with the offerors. Therefore, each application should be submitted on the most favorable terms from a technical and cost standpoint that the offeror can submit to DOE. However, the Government reserves the right, without limitation, to accept or reject any or all applications and to request additional clarifying information, including budgetary data. It is further anticipated that selection will be made in early April 1998, with most awards negotiated by the end of July 1998.

Because of the large number of applications received in response to this solicitation, DOE does not intend to acknowledge receipt of individual applications. If application receipt acknowledgement is required, please send a

self-addressed postcard for completion. **OFFERORS ARE REQUESTED NOT TO CALL TO INQUIRE ABOUT RECEIPT OF A SPECIFIC APPLICATION.** If, following preliminary review, an application is found ineligible for consideration of its technical merits, the submitting institution will be notified in writing as to the reason for the application's rejection, and the original and all copies of the application will be returned. Upon completion of the comprehensive evaluation of all other applications, the submitting institution will be notified in writing whether or not their application has been selected for negotiation of an assistance (grant) award.

The designated Government Representative for this Program Solicitation is Debra A. Duncan. Any communications regarding this solicitation shall be only with the designated Government Representative. All communications should cite the Program Solicitation number (DE-PS26-98FT98200) and be directed to her attention at the address prescribed in Section 8.1, by facsimile to 412-892-6216, or by E-mail to: duncan@fetc.doe.gov.

Sincerely,

Raymond D. Johnson
Contracting Officer

PROGRAM SOLICITATION NUMBER DE- PS26- 98FT98200

**SUPPORT OF ADVANCED COAL RESEARCH AT U. S.
UNIVERSITIES AND COLLEGES**

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CLOSING DATE: NOVEMBER 26, 1997

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NOTE:

INTERNET USERS

PLEASE CHECK THE FETC WORLD WIDE WEB SERVER FOR ANY AMENDMENTS PERTINENT TO THIS SOLICITATION PRIOR TO APPLICATION SUBMITTAL.

INTERNET ADDRESS: <http://www.fetc.doe.gov/business/solicit/solicit.html>

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PROGRAM SOLICITATION NUMBER DE-PS26-98FT98200

SUPPORT OF ADVANCED COAL RESEARCH

AT U.S. COLLEGES AND UNIVERSITIES

1.0 INTRODUCTION

Since its inception in FY1980 (by congressional direction), the University Coal Research (UCR) Program has endeavored to maintain and upgrade the educational, training, and research capabilities of U.S. colleges and universities in the field of coal science and technology. The academic environment is well suited to fundamental research of high payoff potential. The involvement of professors and students will be conducive to the generation of fresh ideas and, as the secondary purpose of this program, will ensure a future supply of U.S. coal scientists and technologists. Through Program Solicitation DE-PS26-98FT98200, the Department of Energy's (DOE) Office of Fossil Energy (FE) and the Federal Energy Technology Center (FETC) are seeking applications with the potential to overcome barriers in technology development and accelerate the identification of solutions for energy and environmental problems. Solicited research should contemplate nearly total carbon closure by the year 2015 along with substantial increases in energy conversion efficiency for utilizing our nation's abundant coal resources. Applications submitted in response to this solicitation will be accepted in two subprogram areas: (1) the **Core Program** and (2) the **Innovative Concepts Program**

Statutory authority for the UCR Program is provided by Public Law 95-224, as amended by 97-258.

2.0 ELIGIBILITY REQUIREMENTS

Pursuant to 10 CFR 600.6(b) eligibility for award is restricted to U.S. universities and colleges. Only universities, colleges, or university-affiliated research institutes located in the United States of America and its territories, including the Commonwealth of Puerto Rico and the Virgin Islands, may submit applications for consideration under this Program Solicitation. Submissions from university-affiliated research institutes must be made through the university and the university, not the university-affiliated research institute, will be the award recipient.

3.0 APPLICATION CATEGORIES

3.1 UCR Core Program

Financial assistance research grants awarded under the UCR Core Program are intended to maintain and upgrade educational, training, and research capabilities of U.S. universities in the fields of science and technology related to coal. Faculty members from U.S. colleges, universities, and university-affiliated research institutes are encouraged to submit applications. Joint applications are encouraged to (1) to promote cooperative research between academia, industry, and the government, and (2) to enrich the research experience for faculty and students by expanding their experience to include cooperative work with researchers at other universities and in industry.

Applications under the UCR Core Program will be categorized as one of the following:

- a. Individual application - Application submitted by an individual college/university or from faculty members at two universities submitting a single application. The college/university submitting the application on behalf of both colleges/universities will act as the bargaining agent and will be the recipient of the DOE award.
- b. Joint University application - Application submitted by one college/university on behalf of a team comprising themselves and two (or more) colleges/universities. The college/university submitting the application on behalf of the team will act as the bargaining agent for the team and will be the recipient of the DOE award.
- c. Joint University/Industry application - Application submitted by one college/university on behalf of a team comprising themselves, one (or more) colleges/universities, and one (or more) industrial collaborator(s). The college/university submitting the application on behalf of the team will act as the bargaining agent for the team and will be the recipient of the DOE award.

Private industry may be a collaborator but not a proposer. For the UCR Joint University/Industry applications, industrial collaboration is a mandatory requirement.

Definition of Industrial Collaborator

A small or major business enterprise will qualify as an "Industrial Collaborator;" however, the following are specifically **EXCLUDED** from recognition as industrial collaborators: Federal, State or Local

government agencies (because they are considered to be in the "public" sector), DOE National Laboratories, and other colleges or universities.

Types of Industrial Collaboration

Industry collaboration may include but is not limited to the following:

Designation of one (1) or more industry scientists as co-investigators for a project including performing experiments related to the project or acting as a resource person to others working on the project.

Offering **Industrial Internships** to faculty and/or students involved in the project.

Providing industrial **facilities and/or equipment** to the university to conduct work related to the project.

Cash cost sharing (5% or more of DOE support for project) received by the university awardee from participant(s). Waived fee or profit will not be recognized as allowable cost sharing under this Program Solicitation.

3.2 UCR Innovative Concepts Program

The goal of the Innovative Concepts Program is to develop unique approaches for addressing fossil energy related issues. Applications under the Innovative Concepts Program are invited from all Core Program categories as described in 3.1. Industrial collaboration is not required but strongly encouraged. **No additional funds will be made available for joint versus individual applications submitted under the Innovative Concepts Program**

4.0 LIMITATIONS ON FUNDING AND PROJECT PERIODS

DOE reserves the right to support or not to support, in whole or in part, any or all applications received, and to determine the number of awards to be made through this solicitation subject to funds available in this fiscal year. Approximately \$2.8 million is available for this Program Solicitation.

Applications must include a detailed budget for each year that funds are requested consistent with the instructions provided in Section 7.3.2(e).

4.1 UCR Core Program

The UCR Core Program is budgeted for approximately \$2.3 million, which should provide support for about 8 - 11 financial assistance awards.

The maximum DOE funding for **individual applications** varies according to the length of performance period:

12 month project period	\$ 80,000 (max. DOE funds)
13-24 month project period	\$140,000 (max. DOE funds)
25-60 month project period	\$200,000 (max. DOE funds)

APPLICATIONS MUST SPECIFY A PROJECT PERIOD

The maximum DOE funding for **joint applications** is \$400,000 requiring a performance period of 36 months. **Non-federal cost sharing is required for joint university/industry at a minimum rate of twenty-five percent (25%) of the total proposed project cost.** For example, for a project having a total project cost of \$533,333, the maximum DOE funding would be \$400,000, and the difference (\$133,333) would be the Recipient's minimum cost share. As another example, if the total proposed project cost is \$500,000, then the maximum DOE funding would be \$375,000 (75%) and, the minimum recipient funding would be \$125,000 (25%).

Contracting by the university awardee to the industrial partner(s) is limited to providing consultation, experimental data and/or equipment not available at the university. Contracting to the industrial participant(s) is **limited to a maximum of 25% of DOE support** for the project (this 25% limit excludes equipment included in the **university** budget). Fee or profit cannot be paid to the applicant's proposed partner(s) under this Program Solicitation.

4.2 Innovative Concepts Program

Approximately \$0.5 million is budgeted for the UCR Innovative Concepts Program and should provide for ten (10) financial assistance awards. The maximum DOE funding for innovative concepts applications is \$50,000 and all awards will be for a twelve (12) month performance period. Although encouraged, no cost-sharing is required for applications to the innovative concepts program

5.0 FOCUS AREAS

A concept called "Vision 21" is being developed as part of the Coal and Power Systems Strategic Plan which will provide DOE's FE organization with a clear focus and mission and will be central to the course of fossil energy research. Vision 21 is, in essence, the idea of a modular co-production facility that is designed for facile capture of CO₂. The concept does not define a single, optimum configuration but rather allows for a series of plant configurations, based on common modules, capable of co-producing power, fuels, chemicals, and other high value products with avoidance or sequestration of CO₂ and with low emissions of SO₂, NO_x, and particulates. It is envisioned that their modular construction will permit the plants to be tailored to fit a geographic location and specific market area by selection of the appropriate combination of modules. The modules will be scaled to operate together and may be available in several size ranges. In summary, the distinguishing features of the definitive Vision 21 fleet would be (1) the capability of producing low cost electricity at efficiencies over 60%; (2) near-zero pollutants, i.e., one-tenth of New Source Performance Standards for criteria pollutants; (3) no net CO₂ emissions; (4) fuel flexibility (coal plus other opportunity fuels); (5) co-production of higher value commodities; and (6) modular design that permits customizing a plant to a given market area.

For purposes of this solicitation, the feedstock may be coal or any carbonaceous material in combination with coal. Gas or biomass could be combined with the coal to reduce or offset fossil carbon emissions in stages of development where CO₂ was not completely sequestered. Petroleum coke could be used near refineries and municipal waste could also be a fraction of any feed. These Vision 21 plants would answer the needs of a deregulated power industry in that they would provide the ability to supply distributed power while producing high value products. The flexibility to shift product distribution with market forces would make the fledgling plants more robust in a competitive market. The capability to readily capture a concentrated CO₂ stream will be an added benefit should a "carbon tax" be levied and would allow market forces to determine whether carbon is sequestered or taxed-on-release. The Power/Fuels/ Chemicals industry will produce environmentally responsible power, fuels, and chemicals that will be the basis for a secure energy future. The high efficiency of the new power systems will allow more efficient use of indigenous resources and further reduce CO₂ emissions. Developments in breakthrough technologies, such as the high temperature hydrogen separation membrane and advanced oxygen production, will be spinoffs that will be beneficial to many industries. The work in three-phase slurry reactors is universally applicable to chemical and petroleum industries, and development of advanced diesel fuels will increase gas mileage by 50% or more while reducing particulates and CO₂ emissions. Advanced research into areas of proposed regulation and into newly regulated materials, such as PM_{2.5} and mercury, will provide the knowledge base necessary for judicious application of the law. A

module will be included in the Vision 21 slate when it has been physically demonstrated at full-scale. Data from these demonstrations will permit ready simulation of any permutation of modules in a "virtual demonstration" of a plant configuration. At some point, it will be possible to provide the market and feedstock information for a geographic area and receive a prioritized list of plant configurations based on demonstrated modules. This virtual demonstration will provide significant economies when siting, designing, and constructing Vision 21 plants. Research should be continuous in all areas of fuels, chemicals, and carbon materials production and power generation to include environmental mitigation technologies and facile CO₂ capture. As developments in some technologies are slowed by barriers, those technologies may be moved back into a more advanced research mode. No area should be completely abandoned. The advantage of the Vision concept is that, for example, if one gasifier technology is slowed, another will be developed in parallel. If a technology is not able to be economically developed, it will not stop the progress of Vision 21, but will only change configuration options. The UCR program is moving in the direction of Vision 21 and will be providing the longer range research needs associated with Vision 21 in addition to continuing to support our present program areas. As you may infer, Vision 21 is not exclusive of our present work, but is rather a concept that provides a longer term focus and direction to our research programs.

5.1 UCR Core Program

DOE is interested in innovative and fundamental research pertinent to coal conversion and utilization limited to six (6) focus areas under the **UCR Core Program**. The focus areas are listed in descending order of programmatic priority. DOE intends to fund at least one application in each focus area; however, high quality applications in a higher ranked focus area may be given more consideration during the selection process. The areas sought in the focus areas are not intended to be all-encompassing, and it is specifically emphasized that other subjects for coal research that fall within their scope will receive the same evaluation and consideration for support as the examples cited.

5.1.1 Mercury Detection and Control

Concern over mercury emissions from power plant stack gas has increased since the 1990 Amendments to the Clean Air Act, where mercury was included in the list of 189 hazardous air pollutants. Mercury is present in most coals at trace levels and, during gasification or combustion processes, is partitioned between the ash, particulate (fly ash), and gas phases. Any mercury in the ash or particulate is readily measured and controlled, but the behavior of vapor phase mercury is problematic. Significant quantities of mercury leave the

gasification or combustion zone in the vapor phase as elemental mercury, mercuric chloride, or some other volatile mercury compound, and no known single technique can effectively remove all forms of mercury. The initial distribution between the elemental and oxidized mercury varies with the plant, coal, and conditions. As the entrained vapor travels down the thermal and chemical gradients of subsequent gas processing, be it for gasification or combustion, the valence states and forms of the mercury change, yet again, as the various mercury species react with oxidizing gases, such as chlorine, added gas treatment reagents, and compounds sorbed on them. In addition, fly ash, unburned carbon, and other particulate components of the gas stream may interact or catalyze reactions of the mercury compounds.

It has become apparent that the system is significantly more complex than previously imagined and that to measure and control mercury in these gas streams, a basic understanding of the chemistry of mercury under the range of thermal and chemical conditions found in gasification and combustion processes is necessary.

Applications are sought for fundamental investigations into the measurement and the removal of mercury and mercury compounds in coal fired power plant flue gases and coal gasifier internal process streams. In particular, the applications should focus on one or both of the following aspects: (1) Defining and understanding the mechanisms involved with mercury transformation during combustion and gasification, focusing on the identification of the rate-controlling steps (i.e., transport, equilibria, and kinetics), and (2) Defining and understanding the mechanisms involved with mercury transformations during post combustion/gasification conditions (i.e., gas and particle phase interactions) resulting in the absorption of mercury and conversion of one form of mercury to another. This would include defining and understanding the physical and chemical interactions of flue gas constituents (vapor and particle) on the absorption of mercury while injecting novel sorbents.

Novelty of approach, coupled with the likelihood of providing useful measurements and fundamental data must be demonstrated in the successful application. Applications based on incremental additions to the current DOE funded, mercury-related, database are not encouraged.

5.1.2 Novel Catalysts for Advanced Diesel Fuels

With the renewed interest in synthetic diesel fuels derived from Fischer-Tropsch (F-T) reaction of Syngas and the concomitant research into oxygenated diesel fuels, such as ethers and acetals, there is a need for new catalysts that are more selective, operate under milder conditions, and economically produce stable, high-cetane-number diesel fuels and additives. These would be produced either in a stand alone facility or, more likely, as part of a coal-fed Vision 21 co-production plant. The drive to produce diesel specification fuels is the result of increased sales of light trucks, vans, and sport/utility vehicles that now account for over 50% of the market. These vehicles, much less fuel efficient than modern sedans, will probably be forced to use diesel engines to meet Corporate Average Fuel Economy requirements. The engines will behave operationally and environmentally like modern spark ignition engines and use fuels that are compatible with the present distribution infrastructure to ease the conversion to the new fuels.

Applications are sought for investigations into the area of new catalysts for selective, economic, and environmentally acceptable oxygenated and high-cetane-number diesel fuels. The fuels produced must be compression ignitable and may not include methanol. The work should lead to novel catalysts to produce such fuels or a better basic understanding of catalytic production of diesel fuels.

5.1.3 Advanced Air Separation Technologies

An Integrated Gasification Combined Cycle (IGCC) system is a likely modular component of a Vision 21 co-production plant. In an IGCC system, coal and other carbonaceous feedstocks are partially combusted at elevated temperatures and pressures to produce synthesis gas, a mixture of carbon monoxide and hydrogen. The synthesis gas must be cleaned of sulfur compounds and particulates before use. IGCC technology is ideally suited for the coproduction of electricity and high quality transportation fuel or a host of high-value chemicals to meet specific market needs. For the production of electricity, the gasifier can use either air or pure oxygen for the partial combustion reactions. However, for coproduction of power and fuels/chemicals, oxygen is required to reduce the quantity of inert materials in downstream process units. The coproduction

option offers the potential for early introduction of IGCC technologies in the United States through integration with existing manufacturing facilities and will lead directly to Vision 21 plants. Through the continued development of improved technologies, DOE hopes to further reduce the capital cost of IGCC facilities to below \$1,000 per kilowatt, achieve high overall plant efficiencies, produce environmentally superior transportation fuels that are cost competitive with those produced from petroleum, and to reduce carbon dioxide emissions.

Applications are sought to develop advanced air separation techniques that have potential for substantial reductions in capital and operating costs compared with commercial cryogenic air separation technologies and result in improved overall process efficiencies for Vision 21 modules such as IGCC with co-production of fuels and chemicals. The proposed technologies can either focus on the production of pure oxygen or enriched air (e.g., 65-85% oxygen in nitrogen). Such technologies are not further defined but could include advanced molecular sieve membranes, advanced absorption technologies or oxygen transport membranes. The proposed concept need not be a standalone technology and those that require integration into specific processes to achieve the desired cost and efficiency improvements are acceptable.

5.1.4 Direct Coal Liquefaction

Direct coal liquefaction includes technologies for converting coal or mixtures of coal with petroleum resids, waste materials (plastics, rubber), or biomass (wood, paper) to liquid products suitable for further refining for ultimate use as transportation fuels. Application of these technologies has been delayed by the need to reduce costs of both the initial conversion processes and the downstream processes for the upgrading of the liquid products. Better knowledge of chemical reactions pertinent to the conversion of coal and the prevention of the formation of refractory products would benefit the design of process strategies and to reduce cost of direct liquefaction. Knowledge that would enable the more efficient use of hydrogen would improve the overall thermal efficiency and reduce the net emissions of CO₂ from the conversion process. A key requirement for improving the science underlying the technology of the initial conversion of coal, or its co-processing mixtures, is a better understanding of the complex

chemistry of the conversion steps. These steps involve combinations of thermal cracking and hydrogenation, usually with a dispersed or supported catalyst. Another problem lie in the hydrotreatment of the liquids produced by the initial steps. This downstream catalytic upgrading involves extensive hydrogenation in order ultimately to produce a fuel that will meet performance and environmental standards. Reduction of the cost and hydrogen consumption in these upgrading steps requires raising the performance of catalytic hydrotreating processes. Such improvements would be made easier if better knowledge of the target molecules for hydrodesulfurization and hydrodenitrogenation were available.

Applications are being sought to understand these mechanisms better, or to develop ways to overcome these barriers to advancing this technology.

5.1.5 CO₂ Capture and Sequestration

Future advanced power generation systems, such as Vision 21, will be designed to eliminate any CO₂ emissions from the plant. The high energy penalties and high costs associated with removing CO₂ from the flue gas of a fossil fuel-fired power plant represent major impediments to future use of CO₂ sequestration. Novel methods for capture and sequestration of CO₂ that sharply reduce these energy penalties and costs must be investigated. Promising approaches could include the development of new scrubbing solvents or sorbents, or the development of advanced sequestration techniques that are compatible with the Vision 21 concept. Since, in the sequestration schemes for CO₂, transport could be a major economic and practical concern, proposed ideas may also be related to the ease of transporting CO₂ to a storage site. Proposed methods of CO₂ disposal could include but not be limited to new ideas on using oil and gas reservoirs, the deep oceans, deep confined aquifers, and mineral carbonates.

Applications are sought to investigate areas of novel methods of CO₂ capture and sequestration that are technically, economically, and ecologically feasible. The proposed work should be consistent with the Vision 21 concept, novel in nature, and may include, but must not be limited to a review of prior research related to this focus area.

5.1.6 Advanced Diagnostics and Modeling Techniques for Three-Phase Slurry Reactors (Bubble Columns)

The F-T synthesis reaction represents an important route to convert coal-derived synthesis gas to hydrocarbon fuels and will be a module for the Vision 21 plants. Slurry phase F-T processing is considered a potentially more economic scheme to convert synthesis gas into liquid fuels, largely due to its relatively simple reactor design, improved thermal efficiency, and ability to process CO-rich synthesis gas. The application of the three-phase slurry reactor system to coal liquefaction and the chemical process industry has recently received considerable attention. A reliable model will be invaluable for the design, scale-up, and efficient operation of the three-phase slurry reactors. To develop such a model, the hydrodynamic parameters and the complex chemistry of the F-T reaction must be fully understood. "Hydrodynamics" includes the rate of mass transfer between the gas and the liquid, gas bubble size, gas, liquid, and solids holdup, and gas, liquid, and solids axial and radial distributions, velocity distribution and flow regimes. Measurement of these parameters must be made under reaction conditions, such as high temperature and pressure, and with the presence of a reaction liquid medium and high gas and solids holdup. It is expected that advanced diagnostic techniques will be required to conduct the measurements under the reaction conditions.

The completed model must be able to predict the holdup of all phases (gas, liquid, and solids), temperature and pressure profiles, and concentration profiles for individual reactants and products.

Applications are sought for investigations of the advanced diagnostic techniques for the measurement of hydrodynamic parameters under F-T reaction conditions. Novelty and innovation coupled with the likely prospect of providing new insight on these long standing problems must be demonstrated in the successful application. Applications based on extensions of traditional methods or past results are discouraged.

Applications are sought for investigations of the development of models for the three-phase slurry reactor. The model must incorporate the hydrodynamic parameters and reaction kinetics. Novelty and innovation coupled with the likely prospect of providing new insight on

these long standing problems must be demonstrated in the successful application.

5.2 UCR Innovative Concepts Program

As the twenty-first century approaches, the challenges facing coal and the electric utility industry continue to grow. Environmental issues such as pollutant control, both criteria and trace, waste minimization, and the co-firing of coal with biomass, waste, or alternative fuels will remain important. The need for increased efficiency, improved reliability, and lower costs will be felt as an aging utility industry faces deregulation. Advanced power systems, such as a Vision 21 plant, and environmental systems will come into play as older plants are retired and utilities explore new ways to meet the growing demand for electricity.

DOE is interested in innovative research in the coal conversion and utilization areas that will be required if coal is to continue to play a dominant role in the generation of electric power. Technical topics like the ones that follow, will need to be answered but are not intended to be all-encompassing. It is specifically emphasized that other subjects for coal research will receive the same evaluation and consideration for support as the examples cited.

5.2.1 Fine Particulate Matter

Fine particulate matter is defined as material with an aerodynamic-equivalent diameter of 2.5 microns or less and is generally represented as PM_{2.5}. It represents a broad class of substances dispersed through the atmosphere and originates from a variety of sources. These particles, which have been associated with adverse human health effects, are generally divided into two classes, Primary and Secondary. Primary particles are emitted directly as such, as fly ash, soot, dust, or sea salt. Secondary particles are formed in the atmosphere mainly from gas phase precursors such as SO₂, NO_x, and VOC to produce particles such as sulfuric acid, ammonium nitrate, and ammonium bisulfate. Recently, the Environmental Protection Agency (EPA) promulgated a new PM_{2.5} National Ambient Air Quality Standards. These standards will affect the operation of much of our industrial base, including fossil fueled power and industrial plants. In light of the regulations, it will be important to capture and identify particles as to composition and probable sources and would greatly affect the industries controlled and the levels of controls required.

Applications are sought for proposals to investigate innovative methods for the quantitative capture and chemical analysis of air borne PM_{2.5} particles with the goal of source apportionment.

Additionally, applications are sought for methods that allow on-line measurement or control at sources such as fossil fueled power and industrial plants.

5.2.2 Materials - Development of Innovative Protective Surface Oxide Coatings

Protection from corrosion and environmental effects arising from damaging reactions with gases and condensed products is required to exploit the potential of advanced high-temperature materials designed to improve energy efficiency fully and reduce deleterious environmental impact (e.g., to achieve the performance goals of the Vision 21 powerplants). The resistance to such reactions is best afforded by the formation of stable surface oxides that are slow growing, compact, and adherent to the substrate or by the deposition of coatings that contain or develop oxides with similar characteristics. However, the ability of brittle ceramic films and coatings to protect the material on which they are formed or deposited has long been problematical, particularly for applications involving numerous or severe high temperature thermal cycles or very aggressive environments. This lack of mechanical reliability severely limits the performance or durability of alloys and ceramics in many high-temperature utility and powerplant applications and places severe restrictions on deployment of such materials. The beneficial effects of certain alloying additions on the growth and adherence of protective oxide scales on metallic substrates are well known, but satisfactory broad understandings of the mechanisms by which scale properties and coating integrity (i.e., corrosion resistance) are improved by compositional, microstructural, and processing modifications are lacking.

Applications are sought for expanding the scientific and technological approaches to improving stable surface oxides for corrosion protection in high-temperature oxidizing environments. The needs are associated with developing innovative oxide coatings and characterizing oxide-metal interfaces and stress effects on scale growth as part of DOE's efforts to establish a sound technical basis for the formulation of specific compositions and synthesis routes for producing materials with tough,

adherent, stable, slow growing oxide scales or coatings that exhibit the improved elevated temperature environmental resistance crucial to the success of many of FE's advanced systems.

5.2.3 In-Situ Removal of Contaminants from High-Temperature Fuel Cells

The product gas from advanced coal gasification systems contains numerous contaminants that are unacceptable for the present designs of high-temperature molten carbonate and solid oxide fuel cells (MCFCs and SOFCs, respectively). In a Vision 21 Plant, as in all coal gasification and combustion processes, there is a tradeoff between gas cleanup and downstream process durability. The desired long-term operation (40,000 hours) of current MCFCs and SOFCs can be significantly reduced by even trace amounts of these contaminants. These contaminants include particulates (e.g., coal fines and ash), sulfur compounds (e.g., H₂S and COS), halides (e.g., HCl and HF), nitrogen compounds (e.g., NH₃ and HCN), and trace metal species (e.g., As, Pb, Hg, Cd, Sn). The effects of these contaminants include plugging of gas passages, corrosion of fuel cell components, and voltage losses due to various mechanisms, including physical absorption, chemisorption, or chemical reaction with fuel cell materials. Tolerance limits can be below 1 ppm, and the effects vary in severity but all are detrimental to fuel cell performance. It is unlikely that the next generation of gas cleanup and gas separation processes in the Vision 21 scenario will provide gas purity sufficient for long-term operation of MCFCs and SOFCs manufactured with current materials and fabrication techniques. If coal-based systems, such as Vision 21, are to take advantage of the high efficiency and other benefits of high-temperature fuel cells, methods for in-situ removal of contaminants will greatly increase the resiliency of these devices and would be applicable to any level of electrode materials technology.

Applications are sought for proposals to investigate innovative methods for cost-effective, in-situ removal of deposits, including ash, carbon, and trace metals, from MCFC and SOFC surfaces. The proposed work may include, but must not be limited to a review of prior research related to this focus area.

5.2.4 Prevention of Catalyst Carryover in Three Phase Reactors

There is renewed interest in F-T derived diesel fuels, produced in a stand alone facility or as part of a coal-fed Vision 21 co-production plant. To maximize the percentage of diesel fuel obtained, the catalyst would be designed to allow diesel range products to be the second largest portion of the product, while maximizing the production of wax. The wax would be further hydrocracked to diesel fuel in a separate step. Assuming that a three-phase slurry reactor would be chosen for the F-T process, there exists the problem of separating the wax from the molten catalyst-wax slurry as its level rises. The wax, of carbon number 20 to 70, is both the product and the slurry medium

Applications are sought to develop operations, processes, or reactor configurations that maintain the necessary catalyst inventory in the reactor.

5.2.5 Advanced Power Generation Cycles

One of the most effective ways to reduce CO₂ and other emissions from coal-fired powerplants and to achieve the targets for the Vision 21 plant is to significantly increase the efficiency of powerplants. New cycles are intended for combined cycle applications, that could increase the efficiency of power plants to well over 45%.

Applications are being solicited for investigation and study of new cycles for power generation. Specific areas of study may include high temperature (~1,000F), high pressure (~2,400 psi) ammonia/water vapor/liquid thermodynamic properties at various volume ratios, validation of efficiency projects, alternative approaches to complex combined cycle evaluations for better matching of conventional and advanced technology processes, economics, and identification of barriers (corrosion and new materials investigations, heat transfer coefficients in two liquid mixtures for application in falling film heat exchangers), to commercialization. Any novel topping and bottoming cycles may be offered.

5.2.6 Liquids from Coal

The many advantages of using and handling liquid fuels and chemical feedstocks has driven research to produce these materials from low-cost, abundant coal. During most of this century, many processes have been developed and a few of these were commercialized at some point.

With the advent of Vision 21 and the co-production concept, opportunities may now exist for identification and development of novel liquefaction processes that would fit the modular design criterion and permit ready sequestration of CO₂.

Applications are being solicited for investigation and study of new methods to produce value-added liquids from coal consistent with the Vision 21 concept.

6.0 APPLICATION SUBMISSION REQUIREMENTS

- a. The **Application must be timely**, in accordance with Section 8.2;
- b. **Applications** (SF 424, Attachment 2) must be submitted and signed by the Principal Investigator and an authorized representative of the submitting college/university.
- c. **Joint Universities and Joint University/Industry Applications**, must identify participating team members. Team members must be clearly identified, i.e., the Statement of Work must set forth the role of each team member by task and the Budget Request must identify and support the associated cost(s) and cost-share(s). Letters of intent to participate in the proposed research from non-applicant members should accompany the application;
- d. The **Proposed Research** must be within the scope of the Focus Areas/Technical Topic(s) specified in Sections 5.1 and 5.2
- e. The **Budget Page** (Attachment 3) must be submitted and must be equal to or less than DOE funding limitations cited in Sections 4.1 and 4.2.

Joint University/Industry Budget Requests must make provision for cost sharing (cash and/or in-kind contributions) from a non-federal source at a **minimum required level of twenty-five (25) percent of the total proposed project value** (cost-sharing may be provided by the college(s)/university(ies), industrial collaborator or combination thereof, or from any other non-federal source). Cost-sharing (type and source) must be clearly identified on the "Budget Page" and included in the detailed budget explanation;

- f. The **Principal Investigator or Co-Principal Investigator** listed on the application must be a teaching professor at the submitting college/university as certified by executing the Teaching Professor/Student Employment Certification (Attachment 6). The core program applications have an additional requirement that at least one (1) registered student at the college/university must

receive compensation for work performed in conducting the proposed research as certified by execution of the Teaching Professor/Student Employment Certification; and

- g. The **Assurances-Non Construction** (Attachment 4) must be provided by all applicants/team members and signed by their authorized representative.
- h. The **Certification of Intent to Comply with DOE Budget Limitations and/or Cost Sharing Requirements** (Attachment 5) must be signed by an authorized representative of the submitting college/university.
- i. The **Certification of Intent to Comply with DOE NAPA (National Environmental Policy Act) Requirements/Complete Environmental Questionnaire** (Attachment 7) must be signed by an authorized representative of the submitting college/university.

7.0 GUIDELINES FOR PREPARING APPLICATIONS

7.1 General

The following general format must be used in preparing all documents: (1) Minimum margins (top, bottom, left and right) of one (1) inch on 8 1/2 x 11-inch paper; (2) font size shall be a minimum of 12 points.

Applications shall be submitted in two (2) separate volumes and in the quantities designated below:

VOLUME I: Technical	Original + 8 copies
VOLUME II: Business/Financial	Original + 3 copies

The "original" of Volumes I and II must be clearly marked "ORIGINAL" and must contain the original signatures required.

Six (6) additional copies of the "Abstract" is requested for peer reviewers' conflict of interest screening.

Following the prescribed format of each volume (see Sections 7.3.1 through 7.3.2) will significantly assist the DOE in the processing of applications. Information that is erroneously placed in a volume other than that specified may not be considered.

7.2 Federal Cost Principles/Cost-Sharing/In-Kind Contributions (10 CFR 600.123)

Federal Cost Principles applicable to specific types of recipients collaborators, and contractors under grants are as follows:

- a. **Institutions of Higher Education.** Office of Management and Budget (OMB) Circular A-21, "Cost Principles Applicable to Grants, Contracts and Other Agreements with Institutions of Higher Education," is applicable to both public and private colleges/universities.
- b. **State and Local Governments and Indian Tribal Governments.** OMB Circular A-87, "Cost Principles Applicable to Grants, Contracts and Other Agreements with State and Local Governments," is applicable to State, local and Indian tribal governments and shall also be used to the extent appropriate for foreign governments.
- c. **Nonprofit Organizations and Individuals.** OMB Circular A-122 "Cost Principles Applicable to Grants, Contracts and other Agreements with Nonprofit Organizations", applies to nonprofit organizations other than a non-profit institution of higher education or hospital. However, certain nonprofit organizations, as specifically listed in OMB Circular A-122, are subject to the commercial cost principles specified in subparagraph (d), below. OMB Circular A-122 shall also apply to grants to individuals.
- d. **Commercial Firms and Certain Nonprofit Organizations.** Title 48 CFR Subpart 31.2 (Federal Acquisition Regulations) "Contracts with Commercial Organizations," as supplemented by 45 CFR Subpart 931.2 (DOE Acquisition Regulations), applies to for-profit organizations (other than for-profit hospitals), including corporations, partnerships and sole proprietorships.

Copies of OMB publications listed in subparagraphs (a)-(d) above may be obtained from the Office of Management and Budget, Office of Administration, Publications Unit, Washington, DC 20503.

Cost Sharing (10 CFR 600.30) is a generic term denoting any situation where the Government does not fully reimburse the applicant for all allowable costs necessary to accomplish the project or effort. Cost sharing may be in various forms or combinations, which include but are not limited to cash outlays, real property (or interest therein) needed for the project, personal property (equipment) or services, cost matching, or other in-kind sharing. Cost sharing may be accomplished by a contribution of either direct or indirect costs provided such costs are otherwise allowable in accordance with the applicable cost principles. Allowable costs which are absorbed by the applicant as part of its cost share may not be charged directly or indirectly to the Federal Government under other contracts, agreements or grants. The applicant's cost sharing may be provided by the applicant or other companies/associations with

which it has contracts. Cost sharing may include the value of contributions of other non-Federal sources, provided the contributions were not previously obtained free of charge from Federal sources.

Third Party In-Kind Contributions represent noncash contributions which are directly beneficial, specifically identifiable and necessary to the performance of the project. Most importantly, third party in-kind contributions must be verifiable from the third party's books and records. The value of any noncash contribution shall be established by the DOE after consultation with the applicant and/or third party donor; **however, adequate supporting documentation must be provided in the application for the estimated value of any noncash contribution.**

7.3 **Content of Applications**

7.3.1 **Volume I - Technical.** Elements comprised by Volume I - Technical (in the order in which they are to be presented), are:

- a. **Application Cover Sheet**, Volume I - Technical, signed by the Principal Investigator, Department Head and authorized representative of the submitting college/university. For the Innovative Concepts Program application(s), the Principal Investigator should provide a one sentence description that best describes the "Technical Topic."

NOTE: Applicants must authorize external review, for evaluation purposes only, in Number 9 of the Application Cover Sheet.

- b. **Proprietary Information Disclosure Statement** (if applicable)
- c. **Table of Contents**
- d. **Public Abstract** - The abstract shall be less than or equal to one (1) single-spaced page. It is suggested that key words be highlighted or underscored to assist in placing the application in the proper group for evaluation.
- *e. **Introduction** (double-spaced, identify as Page 1)
- *f. **Scientific Discussion** (double-spaced - 12-point font). Provide a detailed description of the program objectives toward which the application is addressed and a detailed presentation of the research work and

procedures that will be conducted to achieve these objectives; describe the rationale behind and the technical adequacy of the research approach; and describe any prior experience(s) with the subject topic addressed and list applicable studies conducted that were related to the subject.

***g. Concise Statement of Work (SOW)** proposed (double-spaced)

***h. Literature references** (double-spaced)

i. Appendix (single-spaced): (1) **Vitae**. Provide a brief vitae for the Principal Investigator and the Co-Principal Investigator(s), if any; (2) **Publications**. List publications pertinent to the proposed research; (3) **Facilities**. Identify existing facilities, including specialized equipment, available for use in the proposed research; (4) **Past, Current, and Pending Support**. Identify any past, current or pending support related to the proposed work, and include other DOE Program Offices or Government agencies to which the proposed work has been submitted, and; (5) **Other**. Include letters of commitment/intent from industrial and university collaborators for joint applications and resumes of proposed "consultants," etc.

For the UC Core Program, the combined length of asterisked (*) items e, f, g, and h must not exceed twenty-six (26), double-spaced pages, including figures, tables, etc. Figures and/or tables may be reduced and combined with text, provided that the figures/tables retain their legibility. The applicant is cautioned that if the combined length of the items (e) through (h) exceed the page limitations, only the first 26 pages will be given to the reviewer(s), which would be detrimental to the comprehensive evaluation of the application's technical merit.

For the UC Innovative Concepts Program, the combined length of asterisked (*) f, g, h and i must not exceed five (5), double spaced pages, including figures, tables, etc. Figures and/or tables may be reduced and combined with text, provided that the figures/tables retain their legibility. The applicant is cautioned that if the combined length of the items (f) through (i) exceed the page limitation, only the first 5 pages will be given to the reviewer(s), which would be detrimental to the

comprehensive evaluation of the application's technical merit.

7.3.2 **Volume II - Business/Financial**

Content. The elements comprised by Volume II - Business/Financial (in the order in which they are to be presented), are:

- a. **Application Cover Sheet:** Volume II - Business/Financial, signed by the Principal Investigator and an authorized representative of the submitting college or university.
- b. **Application for Federal Assistance, SF 424,** must be signed by an authorized representative of the submitting college or university.
- c. **Proprietary Information Disclosure Statement** (if applicable)
- d. **Certification of Intent to Comply with DOE Budget Limitations and/or Cost Sharing Requirements**
- e. **Budget Page, DOE F 4620.1** (for Total Project and by Each Year of Project Performance). The Budget Page shall include (1) the Total Project Budget, (2) Yearly Budget (for each year of project performance) and (3) a "budget explanation" showing how costs are derived for each major cost element. An example of the level of detail requested is contained in Attachment 3. The "Budget Request/Explanation" should include, as a minimum, the following information:
 1. **Labor.** Identify individual labor categories and man-hours or percentages of time/individual, including wage-rate or salary used in the computation of cost and any applicable escalation factor(s);
 2. **Fringe Benefits.** Provide the estimated cost of fringe benefits if calculated separately from Labor. If applicable, provide "Current Rate Agreement -- Colleges and Universities," which supports the proposed fringe benefit rate, or explain how the rate was computed.
 3. **Travel.** Itemize each trip as to destination, number of travelers and duration. Rates used to estimate airfare, lodging, meals and incidental

expenses, and ground transportation costs should be provided. Include travel costs for attendance by the Principal Investigator at the annual University Coal Research Contractor's Review Meeting, for grants awarded within a focus area, which will be held in conjunction with the Contractor's Review Meeting in Pittsburgh, Pennsylvania, or another location to be determined at a later date. Funds must also be budgeted for a "peer review" of the project (this meeting will last one day) in the final year of performance. In addition to the Contractor's Review Meeting and the "peer review" meeting, award funds may be used for domestic travel to one (1) technical meeting per year, during each year of the prospective award.

4. **Contracts and Consultants.** Identify proposed contracts to other organizations and their relative cost, providing the same level of cost detail as that required of the applicant (i.e., labor, benefits, supplies, etc.). If a consultant is proposed, provide the hourly/daily rate and its basis, and certify whether or not the proposed rate is the consultant's "most favored customer" rate. Furnish resumes or similar information regarding qualifications or experience. **Profit or fee is NOT permitted** to be paid to contractors under this Program Solicitation.
5. **Equipment, Materials and Supplies.** Elements of cost should be itemized to the extent possible and the basis of the proposed prices substantiated as to written/verbal vendor quotes, catalog pricing, etc. Copies of written quotes and/or the vendor catalog pages should be provided to substantiate costs.
6. **Other Direct Costs (ODC's).** The amount and basis for proposed costs not otherwise shown should be included here.
7. **Indirect Costs.** Provide "Current Rate Agreement -- Colleges and Universities," which substantiates proposed indirect rates with the Federal Government. This may be obtained from the college/university business office (photocopy acceptable). If no such Rate

Agreement exists, explain how the rates were derived.

8. **Cost Participation**, is considered contributions by the applicant, private sector or other third-party co-funder. The Budget Page and the detailed budget breakdown must be consistent and supportable as to source and type of cost-participation (Section 7.3.2.e);
9. **Total Amount Requested from DOE**, should not exceed maximum funding limits as set forth in Sections 4.1 and 4.2;
10. **Total Project Costs**. Total allowable project costs include both costs to be advanced/reimbursed by DOE and costs to be shared by the applicant or third parties, thus total project costs must reflect all costs to be incurred in the performance of the proposed project.
11. **Acknowledgement of Amendments** (if any). Receipt of any Amendments to the Program Solicitation should be acknowledged by listing the amendment number and date of issuance.
12. **Assurances - Non Construction Programs** (SF 424B, Attachment 4) signed by an authorized representative of the submitting university/college. Assurances must also be provided by any other entity participating in the proposed effort.
13. **Certification of Intent to Comply with DOE NEPA Requirements/Complete Environmental Questionnaire** (Attachment 7) Assurance that the Environmental Questionnaire will be submitted within thirty (30) days of the notice of selection and any supplemental information will be provided as requested to help the agency fulfill its NEPA requirements.
14. **Teaching Professor/Student Employment Certification** (Attachment 6) for the Principal Investigator or a Co-Principal Investigator of the submitting university/college. This certification must also be provided by any other college/university participating in the proposed effort.

7.4 **Proprietary Information**

Applications submitted under this solicitation are subject to technical review and evaluation (Sections 9.0 and 10.0); moreover, review of applications submitted in response to the UCR Program will be conducted utilizing personnel (peer reviewers) from universities, industry, and national laboratories, in addition to personnel from the DOE.

Applicants should submit only that proprietary information which they determine is essential for a clear and comprehensive presentation of their application. Applications containing proprietary information will be evaluated with due consideration for protection of this information, to the extent permitted by law, and provided such information is clearly identified by inclusion of the Proprietary Information Disclosure Statement, below:

Proprietary Information Disclosure Statement

"The data submitted on pages ____ of this application have been submitted in confidence and contain trade secrets and/or privileged or confidential commercial or financial information and such data shall be used or disclosed only for evaluation purposes, provided that if a contract is awarded to this applicant as a result of or in connection with the submission of this application, the Government shall have the right to use or disclose the data herein to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose data obtained without restriction from any source, including the applicant. "

In addition, **each page** of the application **containing proprietary data** which the applicant wishes to restrict **must be marked** with the following legend:

"Use or disclosure of the application data on lines specifically identified by asterisk () are subject to the restriction of the cover page of this application".*

Arbitrary and unwarranted use of this restriction is discouraged.

The Government assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.

In the event properly marked data contained in an application in response to this solicitation is requested pursuant to the Freedom of Information Act, 5 USC 552, the applicant will be advised of such request, in accordance with 10 CFR 1004. Prior to release of such information the applicant will be requested to expeditiously

submit to DOE a detailed listing of all information in his application which he believes to be exempt from disclosure under the Act. Such action and cooperation on the part of the applicant will ensure that any information released by DOE pursuant to the Act is properly determined.

7.5 Application Preparation Costs

DOE assumes no responsibility for any costs associated with application preparation, if no award is made. Application costs will be treated in accordance with OMB Circular A-21. Loans are not available under the DOE Minority Economic Impact Loan Program, 10 CFR Part 800, to finance the cost of preparing a financial assistance application.

7.6 Patents, Data, and Copyrights

7.6.1 UCR Core Program

Individual and Joint University/College Applications.

Policies and procedures for patents, data, and copyrights are in accordance with Public Law 96-517. The recipient may retain the entire right, title and interest to each invention, subject to the provisions of 10 CFR 600.27.

Joint University/Industry Applications. Industrial participants in this program, in accordance with applicable statutes and the DOE Acquisition Regulation, have the right to request, in advance of or within 30 days after the effective date of award, a waiver of all or any part of the rights of the U.S. in subject inventions. To receive consideration for a request for patent waiver, a twenty (20%) percent contribution is normally required from the requestor. Small business firms and domestic nonprofit organizations normally will receive the Patent Rights clause of 952.227-71 which permits the contractor to retain title to subject inventions, except in contracts for management or operation of a Government-owned research or production facility and in contracts involving exceptional circumstances or intelligence activities. Therefore small business firms and nonprofit organizations normally need not request a waiver.

7.6.2 UCR Innovative Concepts Program

Policies and procedures for patents, data, and copyrights are in accordance with Public Law 96-517. The recipient may retain the entire right, title and interest to each invention, subject to provisions of 10 CFR 600.27.

8.0 SUBMISSION OF APPLICATIONS

8.1 Mailing and Delivery Address

APPLICATIONS SHOULD BE MAILED (U.S. Postal Service, First Class)
to:

Attn Debra A Duncan MS 921-143
Federal Energy Technology Center
US Department of Energy
PO Box 10940
Cochrans Mill Road
Pittsburgh PA 15236

Code: UCR Application DE-PS26-98FT98200

OR MAY BE DELIVERED Monday through Friday, except Federal
holidays, from 8:00 a.m. to 3:00 p.m. to:

US Department of Energy
Federal Energy Technology Center
Attn: Debra A. Duncan
Wallace Road, Building 921, Room 121
South Park Township (Allegheny County), PA 15236

Code: UCR Application DE-PS26-98FT98200

If delivered by private carrier (a "private carrier" refers to any delivery means other than the U.S. Postal Service), the application must be received at the above location (Wallace Road, Building 921, Room 121) by the deadline date and time cited below.

8.2 Deadline for Submission

Deadline for receipt of applications at DOE is: **3:00 p.m.**, local Pittsburgh time, **November 26, 1997.**

- a.** An application or amendment shall be timely if it is:
1. Received at the location specified in the solicitation on or before the established deadline date and time; or
 2. Received after the deadline date, and the application or amendment was sent by U.S. Postal Service first class mail, was postmarked on or before the deadline date, and is received by DOE before technical

evaluation begins for all acceptable applications submitted in response to the solicitation.

3. Applicants should obtain a legibly dated mailing receipt from the U.S. Postal Service or use certified or registered mail to enable them to substantiate the date of mailing. **(Private metered postmarks shall not be acceptable proof of the date of mailing.)**
- b. DOE shall not consider and shall return, unopened, any application that does not meet the requirements of paragraphs (a)(1), or (a)(2), and (a)(3) of this section.
- c. If necessary, DOE may extend an established application deadline by publishing a timely notice of the extension in the same manner as the solicitation was publicized. The extension of time shall apply to all applicants.
- d. Any modification of an application is subject to the same conditions outlined above.
- e. **The only acceptable evidence to establish timeliness:** (1) the date of mailing of a late application or modification sent either by first class mail, registered mail or certified mail **is the U.S. Postal Service postmark on the wrapper or on the original receipt from the U.S. Postal Service** and (2) the time of receipt at the Government installation **is the time-date stamp of such installation on the application wrapper or other documentary evidence of receipt maintained by the installation.** If neither postmark shows a legible date, the application or modification of application shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise placed impression that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U.S. Postal Service.) Notwithstanding the above, a late modification of an otherwise successful application which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.
- f. Applications may be withdrawn by written or telegraphic notice received at any time prior to award. Applications may be withdrawn in person by an applicant or his authorized representative, provided his identity is made known and he signs a receipt for withdrawal of the application prior to award. (NOTE: The term "telegraphic notice" includes mailgrams.)

8.3 Inquiries Relative to Submission

A preapplication conference will not be held. Questions related to submission of applications to this Program Solicitation should be directed to the Acquisition and Assistance Division at the address shown (see Section 6.1), by telephone at 412-892-5700 or by facsimile at 412-892-6216. The technical merit, program relevance or completeness of applications which have been submitted **will not** be discussed.

9.0 TECHNICAL SCREENING

All applications will be pre-screened for compliance with the solicitation requirements. A preliminary determination will be made regarding the responsiveness of the application to the focus area/technical topic by reviewing the application title and abstract. Innovative Concepts Applications will be subjected to an additional pre-screening step where a literature search will be conducted using key words contained in the application to determine the level of innovation proposed. All applications found materially noncompliant will **not** be comprehensively reviewed. Specific examples of a material noncompliance include: applications that are untimely, applications exceeding the specified DOE funding limitations, applications proposing research outside the technical scope of the solicitation, or applications not consenting to compliance with the Environmental Certification.

Those applications deemed responsive in the pre-screening process will be evaluated for technical merit by peer reviewer panels (PRPs). Members of the PRPs will comprise reviewers from academia, industry, and government. The PRPs will score, rank, and provide substantive technical comments for the Core and Innovative Concepts Applications. Evaluation of the Core or the Innovative Concepts Applications will be based on the criteria respectively outlined in Sections 10.1 and 10.2. Panel members will receive *only* the **Technical Volume** of the application. Peer Reviewers of **Core Applications** will receive a **maximum of 26, double-spaced pages**. Reviewers of the **Innovative Concepts Applications** will receive a **maximum of five, double-spaced pages** along with the results from the literature search described above. The panel members will meet following their individual review of the applications. During this peer review meeting, they will discuss their findings, reach a consensus on their comments for developing a consensus report containing a score, rank, and substantive comments relative to the score regarding the strengths and weakness of each application. The number of panels and the names of the panel members required to review both the Core Applications and Innovative Concepts Applications will be

determined once all applications have been received so that conflicts of interest are avoided.

If numerous applications are submitted to a focus area or technical topic, the applications will be subdivided in groups of no more than 16 and an evaluation team will be established. The evaluation team will be initiated only when more than 16 applications are submitted to a focus area. The team will consist of two government reviewers from each of the peer review panels within a focus area or technical topic. The evaluation team will assess the recommendations from the PRPs including the strengths, weakness, scores, and rank to establish an overall ranking for the applications within the focus area or technical topic.

10.0 EVALUATION CRITERIA

10.1 UCR Core Program

Volume I - Technical applications that pass the pre-screening process described previously will be evaluated according to criteria, (1) through (4), below. The relative importance of each criterion is indicated by the maximum point score (shown in parentheses) allotted.

Criterion 1: The overall merit of the proposed project. (Maximum 45 points) The research represents a significant contribution to expanding the base of knowledge in the defined focus area (10 points). Innovative approaches and solutions are proposed with routine data collection using proven techniques specifically discouraged (25 points). An awareness of the state-of-the-art in related areas of coal research is demonstrated (10 points).

Criterion 2: The stated objectives and the probability of achieving those objectives. (Maximum 40 points) The application clearly addresses a problem, concept or question described within the focus area (10 points). A well-defined, logical statement of work is provided to effectively address the technical issues (20 points). An approach is described that is scientifically sound, well planned, and current methods are used in the investigation (10 points).

Criterion 3: The qualifications of the Principal Investigator(s) or key personnel considered critical to the success of the proposed project. (Maximum 10 points)

Criterion 4: The facilities or specialized equipment/techniques available to the proposers to meet the project objectives .
(Maximum 5 points)

10.2 UCR Innovative Concepts Program

Volume I - All technical applications that pass the pre-screening process described previously will be evaluated according to criteria, (1) through (4), below. The relative importance of each criterion is indicated by the maximum point score (shown in parentheses) allotted.

Criterion 1: The overall merit of the proposed project and the degree of innovation employed. (Maximum 60 points) The research represents a significant contribution to expanding the base of knowledge for developing solution to a technological problem that is a barrier to the broader or improved use of coal (20 points). The proposed approach is innovative and represents a significant departure from state-of-the-art approaches to the described problem (40 points).

Criterion 2: The probability of achieving the research objectives.
(Maximum 25 points) The proposer clearly defines an important problem, concept or question to be investigated (10 points). A well-defined, logical statement of work is provided and an approach is described that is scientifically sound (15 points).

Criterion 3: The qualifications of the Principal Investigator(s) or key personnel considered critical to the success of the proposed project. (Maximum 10 points)

Criterion 4: The facilities or specialized equipment/techniques available to the proposers to meet the project objectives .
(Maximum 5 points) The proposer should possess all equipment critical to the success of the project at the time the application is submitted. The purchase of major equipment, post award, is not allowed.

11.0 PROGRAM POLICY FACTORS

Program Policy Factors are those that, while not related to the applications' technical merit, may critically influence the process of selecting those applications that represent the best range of projects to meet DOE program objectives. In the UCR Program, DOE seeks to encourage broad participation from diverse types of universities and

colleges from all regions of the U.S. In addition, DOE seeks a balanced program in coal research in furtherance of the nation's energy and environmental objectives. Accordingly, the DOE intends to fund at least one application in each focus area under the UCR Core Program; however, high quality applications in a higher ranked focus area, as outlined in section 5.1, may be given more consideration during the selection process. The number of awards under the Innovative Concepts Program will be based on the recommendations of the PRPs. The Source Selection Official will consider the relative technical ranking of the application, the programmatic priority of the Core Program's focus area, and the following program policy factors in determining which application(s) best satisfies program objectives.

- a. Geographic/Regional Balance
- b. Broad University Participation
- c. Collaborative Participation - when two applications are considered equal, consideration will be given to those with collaboration.

12.0 REVIEWER COMMENTS

DOE relies heavily on descriptive/objective comments from the peer reviewers. A summary of reviewers' comments will be made available to applicants post-award announcement. Requests for comments should be made within three (3) months following notification of a applications selection/rejection for award.

13.0 TYPE OF AWARD INSTRUMENT

In accordance with Public Law 95-91, the DOE Organization Act, and Public Law 97-258, the Federal Grant and Cooperative Agreement Act, DOE plans to issue Financial Assistance Grants as the award instrument for applications selected for support in response to the UCR Core Program and the Innovative Concepts Program. The Code of Federal Regulations (CFR) at 10 CFR, Part 600, contains detailed information concerning the DOE "Assistance Regulations."

Awards are expected to be made by the end of July 1998. With the exception of application(s) which may have been returned based on preliminary review, all unsuccessful applications will be retained by DOE and will not be returned to the applicant.

14.0 REPORTING REQUIREMENTS

Reporting Requirements for awards resulting from Program Solicitation DE-PS26-98FT98200 typically include those identified below; specific reports and the frequency of their submission will be included in any award document resulting from this solicitation.

14.1 Federal Assistance Reporting Checklist (DOE F 4600.2)

14.1.1 General

Award recipients under this Program Solicitation will be required to submit reports (technical, financial, property, and environmental) as indicated on DOE F 4600.2, "Federal Assistance Reporting Checklist," of the award document. The requisite number of copies of all reports are required to be sent by the awardee(s) directly to the AAD Document Control Center. Technical reports are subsequently made available to the Office of Science and Technical Information (OSTI), Oak Ridge, Tennessee. Additionally, an Environmental Compliance Plan, an Environmental Monitoring Plan and/or Environmental Status Report(s) may also be required, as determined on a case by case basis.

14.1.2 Financial Reports

The content of the Financial Status Report and Federal Cash Transaction Report shall be as prescribed in 10 CFR 600.152. Financial Reports shall be submitted in the required frequency and quantities as set forth on the DOE F 4600.2, Federal Assistance Reporting Checklist.

- a. Financial Status Report (SF 269A)** This form is used to provide DOE with a final accounting of project funds expended. The accounting may be on either a cash or accrual basis. Actual total expenditures and obligations incurred, but not paid, are reported for each major activity.
- b. Federal Cash Transaction Report (SF 272)** When funds are advanced by Treasury check, the recipient shall submit to DOE a Report of Federal Cash Transactions. For these recipients, DOE shall use information contained in the payment request to monitor recipient cash balances and to obtain disbursement information.

14.1.3 Technical Reports

The content of the Technical Progress Report, Topical Report and Final Technical Report shall be as prescribed in 10 CFR 600.151.

- a. **Technical Progress Report.** This report is required semi-annually (calendar year) and is a summary of the work performed during the period. It will include the technical and scientific results achieved in a brief, concise format. For most grants, a maximum of 5-10 pages excluding figures and data, should be sufficient to describe the completed research and plans for the next quarter. The second (calendar year) semi-annual report should be expanded to provide for detailed information on the results of the past year, problems encountered, significant accomplishments, listing of publications and presentations and approaches to be taken the following year. In lieu of detailed technical information, appended copies of journal articles or preprints may be referred to in the text of the report.
- b. **Topical Report.** These reports detail significant new scientific or technical advances and include journal articles, conference papers, etc., that are related to the DOE-funded activity.
- c. **Final Technical Report** This report is required for all R&D financial assistance awards upon completion of the research effort. It provides a technical accounting of the total work performed on the project. It is a comprehensive description of the results achieved and will include information to support the investigations undertaken, tabulations of data, figures, photographs, and other bibliographic citations. It summarizes all topical reports and technical progress reports, where applicable. The report will include the original hypotheses of the project and present the investigative approaches used, complete with problems encountered and/or departures from the planned methodology, and an assessment of their impact on the project results. The report format should contain an executive summary of the contents followed by a project summary. The main body should include, where applicable, facts, figures, analyses, and assumptions used during the life of the

project to support the conclusions and recommendations. Appendices containing detailed computations and other reference materials may be included.

The above reports are currently being distributed electronically. A brief description of the requirement is as follows:

General (Electronic Reporting). The awardee is responsible for providing all technical reports that are identified in the Reporting Requirements Checklist. The awardee shall submit one good quality hard copy using either permanent or alkaline paper plus an electronic version of each technical report, including, but not limited to, all text, tables, diagrams, photographs, schematics, graphs, and charts. Electronic reports shall be submitted as one file, in the Adobe Acrobat Portable Document Format (PDF).

14.1.4 Environmental Compliance Reports

In response to the requirements of the NEPA and related federal statutes, DOE requires the submission of various documents that assess the environmental aspects and projected impacts of proposed actions. These documents may include:

- a. **Environmental Questionnaire** The DOE has issued NEPA Implementing Regulations which apply to research and development projects. The Environmental Questionnaire will be distributed upon application selection. The selected recipient and team member(s), as appropriate, shall submit the completed Questionnaire within thirty (30) days of notification. DOE will review the information and request any necessary supplemental information. The Questionnaire will be used by DOE to determine the appropriate level of NEPA documentation.
- b. **Hazardous Substance Plan (HSP)** The Hazardous Substance Plan shall specifically identify each Hazardous Substance (as defined under 40 CFR 261, Subpart D, entitled Lists of Hazardous Wastes) that the recipient anticipates will be purchased, utilized or generated in the performance of this grant. For each particular Hazardous Substance identified, the Plan shall provide the following specific information:

- Description of Substance/Chemical
- EPA Hazardous Waste Number
- EPA Hazard Code
- Anticipated Quantity to be purchased, utilized or generated
- Anticipated Hazardous Waste Transporter
- Anticipated Hazardous Waste Disposal Facility Contractor and Location (City/Municipality, State)
- Anticipated Treatment Method

A HSP is required even when there are no hazardous substances identified for use on the project; in this case, a "negative" plan would be submitted.

- c. **Hazardous Waste Report (HWR)** The HWR shall specifically identify each Hazardous Waste (as defined under 40 CFR 261, Subpart D, entitled Lists of Hazardous Wastes) that was actually purchased, utilized, or generated in the performance of this award. For each Hazardous Waste identified, the Report shall provide the following specific information:

- Description of Substance/Chemical
- EPA Hazardous Waste Number
- EPA Hazard Code
- Actual Quantity Disposed
- Actual Hazardous Waste Transporter
- Actual Hazardous Waste Disposal Facility Contractor and Location (City/Municipality, State)
- Actual Disposal Date
- Actual Treatment Method

The HWR is intended as a final reconciliation of anticipated versus actual Hazardous Substances purchased, utilized, or generated in the performance of this grant.

A HWR is required even when no hazardous substances were used on the project; in this case, a "negative" report would be submitted.

The following environmental reports may be required following DOE's review of the recipient's Environmental Questionnaire, if selected for award.

d. Environmental Compliance Plan (ECP) The Environmental Questionnaire provides a broad survey of potential environmental impacts from the proposed action. Should potentially significant environmental concerns be associated with the work of a **selected application**, the applicant may be required to prepare an ECP, an Environmental Monitoring Plan (EMP), and/or Environmental Status Report(s) (ESR) after award. In the event that an ECP is warranted, the plan should outline an approach to implementing an environmental reporting and monitoring strategy. This strategy should include plans for submitting an EMP and, as appropriate, ESR.

e. Environmental Monitoring Plan If DOE's analysis of the potential environmental impacts of the proposed action identifies a need for environmental monitoring, the Recipient will also submit a draft EMP. After consultation with DOE, the draft EMP will be revised, as necessary, and a final EMP will be in place prior to the initiation of any construction activities. The EMP may be revised as the project dictates.

The EMP should evaluate air, land, and water resources using three specific types of monitoring:

1. Compliance Monitoring,
2. Unregulated Pollutant Monitoring, and, if necessary,
3. NEPA-related Monitoring.

Compliance monitoring, i.e., environmental and health monitoring required by Federal, State, and local regulatory agencies, should detail the location, frequency, duration, and substances being monitored. All necessary applications, permits, and licenses should be identified.

f. Environmental Status Report After approval of the comprehensive EMP, and as deemed necessary (as a result of the NEPA process), the results of sampling conducted and other environmental compliance information should be submitted in the form of ESRs.

The necessity of these reports will depend on the size and nature of the project; they will be required quarterly.

The data obtained by implementing an EMP, and reported in the ESRs, will supplement the project's NEPA documentation. It will ensure that project impacts (a) do not violate applicable environmental regulations and (b) are not detrimental to human health or the environment. The information will also provide a database that can be utilized to mitigate environmental problems associated with commercializing the proposed technology.

14.2 Retrospective R&D Benefits Report

The DOE and government in general, is putting increased emphasis on quantifying the benefits or societal economic impacts of its sponsored activities as a means to establish the appropriate future funding levels for programs such as UCR. Because of the fundamental nature of UCR-sponsored research, the full benefits derived from the fundamental-oriented projects may not immediately become evident. Therefore, in an effort to capture the longer term benefits of government-sponsored R&D, FETC is directing the recipient to assume additional reporting responsibilities. For a period of three (3) years following the end of this agreement, the recipient and contractors shall, in a format of their choosing, provide the following information to FETC:

- A listing of publications, theses, patents presentations, workshops, seminars, etc., arising as a result of this research effort.
- A listing of new products, processes, services, joint-ventures, etc., based on information produced during this effort.
- Number of fully or partially-supported students graduated together with type of degree and employer or employer's industry.
- Listing of all government or industry-sponsored research efforts (including DOE efforts) being conducted at your institution that can be considered an extension of this research project or that utilizes equipment or techniques developed primarily during this R&D effort.

This information will be compiled and utilized to identify outputs resulting science-oriented, government-sponsored R&D conducted under the auspices of the UCR Program

15. ANNUAL CONTRACTOR'S REVIEW MEETING/TRAVEL

Principal Investigators will be required to attend a two (2) day, Annual Contractors' Review Meeting and the one-day workshop in Pittsburgh, Pennsylvania, or another location to be determined at a later date. Annual budgets submitted with applications must include estimated expenses for attending this yearly meeting. Principal Investigators are also required to attend a "peer review" of their project in the final year of performance and should budget travel funds accordingly. Additionally, award funds may be used for domestic travel to one (1) technical meeting per year, each year of the respective grant. Included in each budget with regard to travel must be detailed information on travel type (i.e. surface, air), hotel/motel accommodations, and per diem

16. TRANSFER OF GRANTS

Financial assistance awards are made to educational institutions not individuals. Should the Principal Investigator leave the employment of the university at any time before expiration of the grant, the grant will not be transferred to his/her new place of employment. The university will be required to provide a substitute Principal Investigator of acceptable qualifications to DOE, in order to continue research with grant monies. Failing this, the grant will be canceled and the unspent funds will revert to the Government.

17. APPLICATIONS OUTSIDE THE SCOPE OF THIS PROGRAM SOLICITATION

Response to this Program Solicitation does not limit the right of the applicant to submit other project applications to DOE. DOE considers applications in all areas of energy and energy related development submitted by any individual or organization.

Additional specific information on application preparation may be found in "Guide for the Submission of Unsolicited Proposals" (DOE/PR-0014). For copies of this guide or information about applications outside this Program Solicitation contact:

UNSOLICITED PROPOSAL BRANCH
PROCUREMENT AND ASSISTANCE MANAGEMENT DIRECTORATE US
DEPARTMENT OF ENERGY
WASHINGTON, DC 20585
TELEPHONE: 202-586-4920

For further information about the Unsolicited Proposal Program, view the following World Wide Web site:

<http://www.fetc.doe.gov/business/unsol.html>

Raymond D. Johnson
Contracting Officer

Attachments

SUPPORT OF ADVANCED COAL RESEARCH AT U.S. COLLEGES & UNIVERSITIES
(CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA NO. 81.057))

Check One: VOLUME I - TECHNICAL
VOLUME II - BUSINESS/FINANCIAL

1. Principal Investigator's Name: _____

Institutional Address: _____

Telephone No.: _____ Facsimile No.: _____

E-Mail Address: _____

2. Co-Principal Investigator's Name: _____

Institutional Address: _____

Telephone No.: _____ Facsimile No.: _____ 3. Administrative Officer/Business Officer
for Submitting Institution: _____

Institutional Address: _____

Telephone No.: _____ E-MAIL ADDRESS: _____

Facsimile No.: _____ FEDERAL DEMONSTRATION PARTNERSHIP Yes No

Congressional District: _____ County: _____

4. Project Title: _____

5. Submitted in Response to DE-PS22-97PC97200 (Check As Appropriate)

 University Coal Research Core Program:

 Individual College/University, Focus Area # _____

 Joint Colleges/Universities, Focus Area # _____

 Joint University/Industry, Focus Area # _____

Joint Proposal Team Members:

2nd Univ. _____

3rd Univ. _____

Industry _____

 University Coal Research Innovative Concept Program:

Technical Topic _____

Team Members: 1) _____

2) _____

6. Performance Pd: ≤ 12 mos. ≤ 24 mos. ≤ 36 mos. >36 & ≤ 60 mos.
(Check One)

7. Funding Requirements: \$_____ Total Estimated Project Cost
\$_____ DOE \$_____ Institution \$_____ Other

8. This proposal contains proprietary data: No Yes (see
Proprietary Information Disclosure Statement)

9. Authorization of External Review: We, the undersigned, agree
 do not agree to external review of this proposal in confidence

10. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION ARE TRUE
AND CORRECT. THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF
THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF
THE ASSISTANCE IS AWARDED.

Principal Investigator (Date) _____ Department/Organization Head (Date)

Co-Principal Investigator (Date) _____ Authorized Representative (Date)

APPLICATION FOR FEDERAL ASSISTANCE

	2. DATE SUBMITTED	Applicant Identifier
1. TYPE OF SUBMISSION: <i>Application</i> <input type="checkbox"/> Construction <input type="checkbox"/> Non-Construction	3. DATE RECEIVED BY STATE	State Application Identifier
	4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

1. TYPE OF SUBMISSION:

<p><i>Application</i></p> <input type="checkbox"/> Construction <input type="checkbox"/> Non-Construction	<p><i>Preapplication</i></p> <input type="checkbox"/> Construction <input type="checkbox"/> Non-Construction
--	---

5. APPLICANT INFORMATION

Legal Name:	Organizational Unit:
Address (give city, county, state, and zip code):	Name and telephone number of the person to be contacted on matters involving this application (give area code)

6. EMPLOYER IDENTIFICATION NUMBER (EIN): □□ - □□□□□□□□	7. TYPE OF APPLICANT: (enter appropriate letter in box) <input type="checkbox"/> A. State B. County C. Municipal D. Township E. Interstate F. Intermunicipal G. Special District H. Independent School Dist. I. State Controlled Institution of Higher Learning J. Private University K. Indian Tribe L. Individual M. Profit Organization N. Other (Specify): _____
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8. TYPE OF APPLICATION:

New Continuation Revision

If Revision, enter appropriate letter(s) in box(es):

A. Increase Award B. Decrease Award C. Increase Duration
 D. Decrease Duration Other (specify): _____

9. NAME OF FEDERAL AGENCY:

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: □□ - □□□

TITLE: _____

12. AREAS AFFECTED BY PROJECT (cities, counties, states, etc.):

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:

13. PROPOSED PROJECT:		14. CONGRESSIONAL DISTRICTS OF:	
Start Date	Ending Date	a. Applicant	b. Project

15. ESTIMATED FUNDING:

a. Federal	\$.00
b. Applicant	\$.00
c. State	\$.00
d. Local	\$.00
e. Other	\$.00
f. Program Income	\$.00
g. TOTAL	\$.00

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:
 DATE _____

b. NO. PROGRAM IS NOT COVERED BY E.O. 12372
 OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?

Yes If "Yes," attach an explanation No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT. THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Typed Name of Authorized Representative	b. Title	c. Telephone number
d. Signature of Authorized Representative		e. Date Signed

INSTRUCTIONS FOR THE SF 424

This is a standard form used by applicants as a required facesheet for preapplications and applications submitted for Federal assistance. It will be used by Federal agencies to obtain applicant certification that States which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process, have been given an opportunity to review the applicant's submission.

- | Item: | Entry: | Item: | Entry: |
|-------|--|-------|--|
| 1. | Self-explanatory. | 12. | List only the largest political entities affected (e.g., State, counties, cities). |
| 2. | Date application submitted to Federal agency (or State if applicable) & applicant's control number (if applicable). | 13. | Self-explanatory. |
| 3. | State use only (if applicable). | 14. | List the applicant's Congressional District and any District(s) affected by the program or project. |
| 4. | If this application is to continue or revise an existing award, enter present Federal identifier number. If for a new project, leave blank. | 15. | Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in-kind contributions should be included on appropriate lines as applicable. If the action will result in a dollar change to an existing award, indicate <u>only</u> the amount of the change. For decreases, enclose the amounts in parentheses. If both basic and supplemental amounts are included, show breakdown on an attached sheet. For multiple program funding, use totals and show breakdown using same categories as item 15. |
| 5. | Legal name of applicant, name of primary organizational unit which will undertake the assistance activity, complete address of the applicant, and name and telephone number of the person to contact on matters related to this application. | 16. | Applicants should contact the State Single Point of Contact (SPOC) for Federal Executive Order 12372 to determine whether the application is subject to the State intergovernmental review process. |
| 6. | Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service. | 17. | This question applies to the applicant organization, not the person who signs as the authorized representative. Categories of debt include delinquent audit disallowances, loans and taxes. |
| 7. | Enter the appropriate letter in the space provided. | 18. | To be signed by the authorized representative of the applicant. A copy of the governing body's authorization for you to sign this application as official representative must be on file in the applicant's office. (Certain Federal agencies may require that this authorization be submitted as part of this application.) |
| 8. | Check appropriate box and enter appropriate letter(s) in the space(s) provided:

— "New" means a new assistance award.

— "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date.

— "Revision" means any change in the Federal Government's financial obligation or contingent liability from an existing obligation. | | |
| 9. | Name of Federal agency from which assistance is being requested with this application. | | |
| 10. | Use the Catalog of Federal Domestic Assistance number and title of the program under which assistance is requested. | | |
| 11. | Enter a brief descriptive title of the project, if more than one program is involved, you should append an explanation on a separate sheet. If appropriate (e.g., construction or real property projects), attach a map showing project location. For preapplications, use a separate sheet to provide a summary description of this project. | | |

INSTRUCTIONS FOR COMPLETING DOE F 4620.1

1. General

- a. Each new, renewal and supplemental application must contain Budget Pages in this format unless a pertinent program notice guideline specifically provides otherwise. A separate Budget Page must be completed for each year of support requested.
- b. Continuation funding will not require a budget page unless the amount proposed for funding is either 25% over or under the original recommended amount of support for that period. A cover letter signed by the applicant organization official and the Principal Investigator (PI) must accompany this budget and should be forwarded to the U.S. Department of Energy (DOE) Project Officer listed in item 11 of the DOE Financial Assistance Award.
- c. Duplication of this form and instructions may be done by applicants as DOE will not provide additional copies beyond what is contained in the application kit and guide.

EACH BUDGET ITEM MUST BE JUSTIFIED ON CONTINUATION PAGES FOLLOWING THE BUDGET PAGE

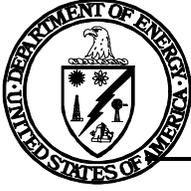
In addition to a full discussion of the budget items needed to carry out the proposed work the following information is mandatory to be included on the budget justification continuation pages in order to be considered a complete application.

- A. "Senior Personnel": List any personnel, funds requested for salary, and the number of person months to be funded. Include any additions in Item A6 on the Budget Page.
 - B. All "Other Personnel": must be listed individually, their rate of pay and % as well as length of time working on the project. Also include a written narrative that fully justifies the need for all requested personnel.
 - C. "Fringe Benefits": must include the current fringe benefit rate established for the applicant organization as well as the total cost or a list of cost and type for each individual employed on the project. Tuition remission for undergraduate or graduate students working on the project must be included in this category or listed as a separate line item in the "Other Category" depending on the applicant organization's system of reporting.
 - D. "Equipment": list each item, its cost and reason it is needed for the project.
 - E. "Travel": list each trip's destination, dates, estimated cost including transportation and subsistence, number of staff traveling and the purpose of the travel and how it relates to the project. This category should include the amounts needed for staff on the project as well as for travel associated with any consultants working on the project.
 - F. "Trainee/Participant Costs": Educational projects that intend to support trainees (precollege, college, graduate and post graduate) must list each trainee cost that includes stipend levels and amounts, cost of tuition for each trainee, cost of any travel (provide the same information as that needed under the regular travel category, Item E), and costs for any other related training expenses. Participant costs are those costs associated with conferences, workshops, symposia or institutes and the breakout items should indicate the number of participants, cost for each participant, purpose of the conference, dates and places of meetings and any related administrative expenses.
 - G. "Other Direct Costs":
 1. **Materials & Supplies:** Indicate types required and estimate costs.
 2. **Publication Costs/Documentation/Dissemination:** Estimate cost of preparing and publishing project results.
 3. **Consultant Services:** Indicate name, daily compensation, number of days service required and justify.
 4. **Computer (ADP) Services:** Include justification based on established computer service rates at the proposing institution. Purchase of equipment is included under D.
 5. **Subcontracts:** Include a budget and justify details.
 6. **Other:** Itemize and justify details. Under this item list tuition remission for students employed to work on this project listed under personnel category. (Do not include tuition remission if this cost is included under the fringe benefit category).
 - H. Total direct costs: (A through G)
 - I. Indirect Costs: Specify current rate(s) and base(s). Use current rate(s) negotiated with the cognizant Federal negotiating Agency.
 - J. Total direct and indirect costs: (H + I)
 - K. Amount of any required cost-sharing from non-Federal sources.
 - L. Total Cost of Project (J + K)
- The personnel categories listed in Part A and B of the Budget Page are defined as follows:
- A. Senior Personnel
 - 1 - 5. (Co) Principal Investigator(s) are individual(s) so designated by the grantee institution.

A Faculty Associate (faculty member) is an individual other than the Principal Investigator who is considered by the performing institution to be a member of its faculty or who holds an appointment as a faculty member at another institution, and who will participate in the project being supported.
 - B. Other Personnel
 1. A Postdoctoral Associate is an individual who received a Ph.D., M.D., D.Sc. or equivalent degree less than 5 years ago, who is not a member of the faculty of the performing institution, and who is not reported under Senior Personnel above.
 2. Other Professional is a person who may or may not hold a doctoral degree or its equivalent who is considered professional and is not reported as a Principal Investigator, faculty associate, postdoctoral associate, or student. Examples of persons included in this category are doctoral associates not reported under B1 above, professional technicians, mathematicians, physicians, veterinarians, systems experts, computer programmers, and design engineers.
 3. A Graduate Student (Research assistant) is a part-time or full-time student working on the project in research capacity who holds at least a bachelor's degree or its equivalent and is enrolled in a degree program leading to an advance degree.
 4. An Undergraduate Student is a student who is enrolled in a degree program (part-time or full-time) leading to a bachelor's degree.
 - 5&6. These include persons working on the project in a nonresearch capacity such as secretaries, clerk-typists, draftsmen, animal caretakers, electricians, and custodial personnel, regardless of whether they hold a degree or are involved in degree work.
- Note: Any personnel category for which funds are requested should indicate the number of persons expected to receive some support and where called for on the budget format, the full-time equivalent (FTE) person-months to the nearest tenth.

OMB Burden Disclosure Statement

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Office of Information Resources Management, AD-244 - GTN, Paperwork Reduction Project (1910-1400), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585; and to the Office of Management and Budget (OMB), Paperwork Reduction Project (1910-1400), Washington, DC 20503.



**U. S. Department of Energy
Federal Energy Technology Center**

P.O. Box 880
Morgantown, WV 26507-0880

3610 Collins Ferry Road
626 Cochrans Mill Road
P.O. Box 10940
Pittsburgh, PA 15236-0940



Attachment 4

FETC ASSURANCES

NON-CONSTRUCTION PROGRAMS PACKAGE

The following forms must be completed for all Federally assisted non-construction programs:

Assurance Nos. 1 to 18	Standard Form 424B, "Assurances - Non-Construction Programs"	Page 2
Assurance 19	Certification Regarding a Drug-Free Workplace	Page 4
Assurance 20	Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions	Page 4
Assurance 21	Certification for Contracts, Grants, Loans, and Cooperative Agreements (DEC 1989)	Page 5
SF - LLL	Disclosure of Lobbying Activities	Page 6
DOE F 1600.5	U.S. Department of Energy Assurance of Compliance Nondiscrimination in Federally Assisted Programs (OMB Burden Disclosure Statement)	Page 8

ASSURANCES - NON-CONSTRUCTION PROGRAMS

OMB Approval No. 0348-0040

Note: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant I certify that the applicant:

-
1. Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
 2. Will give the awarding agency, the Comptroller General of the United States, and if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award, and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
 3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
 4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
 5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the nineteen statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
 6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to : (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age. (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse. (f) The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. 290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records. (h) Title VII of the Civil Rights Act of 1968 (42 U.S.C. 33601 et seq.), as amended, relating to non discrimination in the sale, rental, or financing of housing. (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made. and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
 7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance Policies Act of 1970 (P.L. 91-646, which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
 8. Will comply with the provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.
 9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §§874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988. (e) assurance of project consistency with the approved State Management Program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq); (f) conformity of Federal actions to State (Clear Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §7401 et seq); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended, (P.L. 93-523); and (h) protection of endangered species under the Endangered Species Act of 1973, as amended, (P.L. 930205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq) related to protecting components or potential components of the national wild and scenic rivers systems.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469a-1 et seq).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. 2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 334801 et seq) which prohibits the use of lead based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act of 1984.
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations and policies governing this program.

19. CERTIFICATION REGARDING A DRUG-FREE WORKPLACE

This certification is required by the Drug-Free Workplace Act of 1988 (Pub. L. 100-690, Title V, Subtitle D) and is implemented through additions to the Debarment and Suspension regulations, published in the Federal Register on January 31, 1989.

An organizational applicant certifies that it will provide a drug-free workplace by:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violations of such prohibition;
- (b) Establishing a drug-free awareness program to inform such employees about--
 - (1) The dangers of drug abuse in the workplace;
 - (2) The grantee's policy of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
- (c) Making it a requirement that each employees engaged in performance of the grant be given a copy of the statement required by paragraph (a);
- (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of continued employment under the grant, the employee will--
 - (1) Abide by the terms of the statement; and
 - (2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace not later than five (5) calendar days after such conviction;
- (e) Notifying the agency within ten (10) calendar days after receiving notice under subparagraph (d) (2) from an employee or otherwise receiving actual notice of such conviction;
- (f) Taking one of the following actions within thirty (30) calendar days after receiving notice under subparagraph (d) (2), with respect to any employee who is convicted--
 - (1) Taking appropriate personnel action against such employee, up to and including termination; or
 - (2) Requiring such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- (g) Making a good faith effort to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f).

Place of Performance: The applicant shall insert in the space provided below the site(s) for the performance of work done in connection with the specific grant: (street address, city, county, state, zip code).

An applicant who is an individual certifies that, as a condition of the grant, he/she will not engage in the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance in conducting any activity with this grant.

This assurance is given in connection with any and all financial assistance from the Department of Energy after the date this form is signed. This includes payments after such date for financial assistance approved before such date. The applicant recognizes and agrees that any such assistance will be extended in reliance on the representations and agreements made in this assurance, and the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the applicant, its successors, transferees, and assignees, and on the authorized official (or individual applicant, as appropriate) whose signature appears below.

20. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS-PRIMARY COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85. Section 85.510, Participants' responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211).

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1.b. of this certification; and
 - d. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
2. Where the prospective primary participants is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Instructions for Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. This certification or explanation will be considered in connection with the department of agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an

explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Page 6 of 11

4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "Proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.
6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion-Lower tier Covered Transactions," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

21. **CERTIFICATION FOR CONTRACTS, GRANTS, LOANS, AND COOPERATIVE AGREEMENTS (DEC 1989)**

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriate funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,00 for each such failure.

22. **SIGNATURE/CERTIFICATION**

Organization Name

Name and Title of Authorized Representative

Signature

Date

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
 (See reverse for public burden disclosure.)

1. Type of Federal Action <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan agreement <input type="checkbox"/> f. loan insurance	2. Status of Federal Action <input type="checkbox"/> a. Bid/offer/application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award	3. Report Type: <input type="checkbox"/> a. Initial filing <input type="checkbox"/> b. material change For Material Change only: Year ____ quarter ____ date of last report ____
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4. Name and Address of Reporting Entity: <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier_____, <i>if known:</i> Congressional District, <i>if known:</i>	5. If Reporting Entity in No.4 is Subawardee. Enter Name and Address of Prime: Congressional District, <i>if known:</i>
6. Federal Department/Agency:	7. Federal Program Name/Description: A Number, <i>if applicable:</i> _____
8. Federal Action Number, <i>if known:</i>	9. Award Amount, <i>if known:</i> \$
10. a. Name and Address of Lobbying Registrant (<i>if individual, last name, first name, MI</i>):	b. Individuals Performing Services (<i>including address if different from No. 10a</i>) (<i>last name, first name, MI</i>):

11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$70,000 and not more than \$100,000 for each failure.	Signature: _____ Print Name: _____ Title: _____ Telephone No: _____ Date: _____
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Federal Use Only:	Authorized for local reproduction Standard Form - LLL
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INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of connection with a covered Federal action. Complete all items that apply for both the initial and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g. the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient, include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the Registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.

(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

U.S. Department of Energy
Assurance of Compliance
Nondiscrimination in Federally Assisted Programs

OMB Burden Disclosure Statement

Public reporting for this collection of information is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Office of Information Resources Management Policy, Plans, and Oversight; Records Management Division, HR-422-GTN, Paperwork Reduction Project (1910-0400), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585, and to the Office of Management and Budget (OMB), Paperwork Reduction Project (1910-0400), Washington, D.C. 20503.

_____ (Hereinafter called the "Applicant") HEREBY AGREES to comply with Title VI of the Civil Rights Act of 1964 (Pub. L. 88-352), Section 16 of the Federal Energy Administration Act of 1974 (Pub. L. 93-275), Section 401 of the Energy Reorganization Act of 1974 (Pub. L. 93-438), Title IX of the Education Amendments of 1972 as amended (Pub. L. 92-318, Pub. L. 93-588 and Pub. L. 94-482), Section 504 of the Rehabilitation Act of 1973 (Pub. L. 93-112), the Age Discrimination Act of 1975 (Pub. L. 94-135), Title VIII of the Civil Rights Act of 1968 (Pub. L. 90-284), the Department of Energy Organization Act of 1977 (Pub. L. 95-91), and the Energy Conservation and Production Act of 1976 as amended (Pub. L. 94-385), and Title 10, Code of Federal Regulations, Part 1040. In accordance with the above laws and regulations issued pursuant thereto, the Applicant agrees to assure that no person in the United States shall on the ground of race, color, national origin, sex, age, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity in which the Applicant receives Federal assistance from the Department of Energy.

Applicability and Period of Obligation

In the case of any service, financial aid, covered employment, equipment, property, or structure provided, leased, or improved with Federal Assistance extended to the Applicant by the Department of Energy, this assurance obligates the Applicant for the period during which Federal Assistance is extended. In the case of any transfer of such service, financial aid, equipment, property, or structure, this assurance obligates the transferee for the period during which Federal assistance is extended. If any personal property is so provided, this assurance obligates the Applicant for the period during which it retains ownership or possession of the property. In all other cases this assurance obligates the Applicant for the period during which the Federal assistance is extended to the Applicant by the Department of Energy.

Employment Practices

Where a primary objective of the Federal assistance is to provide employment or where the Applicant's employment practices affect the delivery of services in programs or activities resulting from Federal assistance extended by the Department, the Applicant agrees not to discriminate on the ground of race, color, national origin, sex, age, or handicap in its employment practices. Such employment practices may include, but are not limited to, recruitment, recruit advertising, hiring, layoff or termination, promotion, demotion, transfer, rates of pay, training, and participation in upward mobility programs or other forms of compensation and use of facilities.

Subrecipient Assurance

The Applicant shall require any individual, organization, or other entity with whom it subcontracts, subgrants, or subleases for the purpose of providing any service, financial aid, equipment, property, or structure to comply with laws cited above. To this end, the subrecipient shall be required to sign a written assurance form, however, the obligation of both recipient and subrecipient to ensure compliance is not relieved by the collection or submission of written assurance forms.

Data Collection and Access to Records

The Applicant agrees to compile and maintain information pertaining to programs or activities developed as a result of the Applicant's receipt of Federal assistance from the Department of Energy. Such information shall include, but is not limited to the following: (1) the manner in which services are or will be provided and related data necessary for determining whether any persons are or will be denied such services on the basis of prohibited discrimination; (2) the population eligible to be served by race, color, national origin, sex, age, and handicap; (3) data regarding covered employment including use or planned use of bilingual public contact employees serving beneficiaries of the program where necessary to permit effective participation by beneficiary unable to speak or understand English; (4) the location of existing or proposed facilities connected with the program and related information adequate for determining whether the location has or will have the effect of unnecessarily denying access to any person on the basis of prohibited discrimination; (5) the present or proposed membership by race, color, national origin, sex, age, and handicap in any planning or advisory body which is an integral part of the program; and (6) assure compliance by recipients with laws cited in the first paragraph of this assurance.

The Applicant agrees to submit requested data to the Department of Energy regarding programs and activities developed by the Applicant from the use of Federal assistance funds extended by the Department of Energy. Facilities of the Applicant (including the physical plants, buildings, or other structures) and all records, books, accounts, and other sources of information pertinent to the Applicants compliance with the civil rights laws shall be made available for inspection during normal business hours on request of an officer or employee of the Department of Energy specifically authorized to make such inspections. Instructions in this regard will be provided by the Directors Office of Equal Opportunity, U.S. Department of Energy.

This assurance is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts (excluding procurement contracts), property discounts, or other Federal assistance extended after the date hereto, to the Applicants by the Department of Energy, including installment payments on account after such data of application for Federal Assistance which are approved before such date. The Applicant recognizes and agrees that such Federal assistance will be extended in reliance upon the representations and agreements made in this assurance and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, as well as the persons whose signatures appear below and who are authorized to sign this assurance on behalf of the Applicant.

Applicant Certification

The Applicant certifies that it has complied, or that, within 90 days of the date of the grant, it will comply with all applicable requirements of 10 C.F.R. § 1040.5 (a copy will be furnished to the Applicant upon written request to DOE).

Designated Responsible Employee

_____		() _____
Name and Title (Printed or Typed)		Telephone Number
_____		_____
Signature	Date	

_____		() _____
Applicant's Name		Telephone Number
_____		_____
Address	Date	

Authorized Official:
President, Chief Executive Officer
or Authorized Designee

_____		() _____
Name and Title (Printed or Typed)		Telephone Number
_____		_____
Signature	Date	

CERTIFICATION OF INTENT TO COMPLY WITH DOE BUDGET LIMITATIONS AND/OR
COST-SHARING REQUIREMENTS

The Applicant, _____, if
(name of submitting college/university)

selected for award under solicitation DE-PS26-98FT98200, "Support of Advanced
Coal Research at U.S. Colleges and Universities," agrees that:

(1) [Applies to the Core Program (Individual College/University
and Joint Applicants) and the Innovative Concepts Program]

If, following DOE's review of Volume II of the application, it is
found that the proposed request for DOE funds exceeds the maximum
funding limitation as set forth in the solicitation (Section 4.1 and
4.2), the applicant shall perform the effort within the maximum DOE
funding limitation and cost-share the difference.

(2) [Applies to the Joint University/Industry Applicants
only]

If, following DOE's review of Volume II of the application, it
is found that the proposed cost share does not meet the
minimum 25% of total project costs as set forth in the
solicitation (Section 4.1) the applicant shall cost share a
minimum of twenty-five percent (25%) of the total project
cost.

(Name of Authorized Official)

(Date)

PROGRAM SOLICITATION DE-PS26-98FT98200

TEACHING PROFESSOR/STUDENT EMPLOYMENT CERTIFICATION

I _____ hereby certify that I am a teaching professor at _____. Furthermore, if a grant is awarded in the UCR Core Program area as a result of this application, at least one student registered at the University will receive compensation for work performed in the conduct of research proposed in the application.

(Signature)
Principal Investigator or
Co-Principal Investigator

(Date)

**CERTIFICATION OF INTENT TO COMPLY WITH DOE NEPA
REQUIREMENTS/COMPLETE ENVIRONMENTAL QUESTIONNAIRE**

The Applicant, _____, if
(name of institution)

selected for award under Program Solicitation DE-PS26-98FT98200, "Support of
Advanced Coal Research by U.S. Colleges and Universities," agrees that, it will
complete the Environmental Questionnaire within thirty (30) days of request, and
provide any other environmental-related data as requested by DOE to satisfy
NEPA requirements.

(Signature of Authorized Official)

(Date)